Victoria Crescent SuDS Project

SuDS used

- *Rain gardens*
- *Grass Swales*
- *Low Flow Turf Channel*
- *Trees Planting*
- *Mounds*

Benefits

- ***Water Quantity:*** *Storage of run-off water from existing buildings roofs, nearby highways and footways, controlled discharge via a series of various treatment trains.*
- ***Water Management:*** *Infiltration and evapotranspiration of surface water through various features like Rain gardens, Swales, Turf Channel, mounds and Tree planting. Also managing the water in effective way by*

series of above ground features and treating the hydrocarbon and pollutants via various treatment trains.

- ***Amenity, Ecology & Biodiversity:***

  Increase an amenity value, social cohesion and well-being of Council's tenants within affordable and social housing. Improve the biodiversity and increase ecology value by use of native species within rain gardens, planting new trees and creation of habitats.

Play Features: *Providing play features like balance beams, stepping logs, boulders, playing logs and wooden bridge for children living within those block of flats and nearby areas.*

1. Location

Victoria Crescent, St. Ann's, London, N15 5LR

2. Description

London Borough of Haringey commissioned a SuDS site appraisal study for Council's social and affordable housing estate to consider the potential for developing Victoria Crescent in South Tottenham. We assessed and identified the communal area within for the retrofit SuDS features to improve an existing amenity space and to reduce the risk of surface water flooding within the Victoria Crescent. These will also promote an appeal and usability of the communal area whilst helping to clean and collect the rainwater runoff from nearby flats. The whole idea will offset the risk of flooding and pollution into downstream properties and nearby rivers. Visually attractive appearance and interactive aspects are included within the design of the rainwater management features.

Few options have been considered regarding how they will benefit the site and greater area, and in relation to improvements to the following primary and secondary objectives:

The primary objectives are:

- Reduce flows from the highway drainage network within area and Thames Water (TW) sewer network, hence incrementally reduce the risk of flooding in wider catchment.
- Utilising SuDS features to achieve reduction in flood risk and flows within drainage and sewerage networks.
- Regenerate the communal area between the flats.

The secondary objectives are:

- Identifying relatively low-cost options.
- Minimising disruption to the residents and nearby areas.
- Ensuring maintenance requirements for Haringey Council are not overly onerous.

- Improving the quality of environment.

3. Main SuDS components used

- ***A series of Rain gardens & Circular Basins:***

  These are combination of planted native shrubs, flowers and perennials in a small depression surrounded by natural grass and road kerbs. These bioretention facilities, were designed to reduce the flow rate and to treat the polluted stormwater runoff from roof and nearby public highways and footways.

  In total 6 rain gardens including a circular basin and a big "S" shaped garden were constructed as part of this project. This is purely for the surface water storage and treatment management train to take the run-off from affordable housing and channelled them into the rain garden following various treatments

- ***Grass Swales and low flow turf channel:***

  The swales and turf channel were constructed to store and convey water within the communal area and between various rain gardens. Swales are shallow channels covered by grass and vegetation in places. These were designed to maximise the water quality treatment benefits.

  For this project, all the grass swales and low turf channel were mainly grassed to achieve the maximum water quality benefits.

- ***Trees Planting:***

  Trees have vital role to play in managing the storm water. They aid in water interception, storage and infiltration while increasing an evapotranspiration potential.

  For this project, in total 3 new trees were planted. Unarguably the largest living things on the earth, beautiful both in and out of the season. Trees can bring birds and other wildlife into the city. Increasingly valued natural UV protection and significant cooling through both shade and evapotranspiration.

- ***Mounds:***

  The mounds are a heaped pile of earth, sand, rocks or debris. Most commonly, mounds are earthen formations such as hills and mountains, particularly in they appear artificial. They always slow down and hold the excess amount of water.

  For Victoria Crescent project, in total 5 massive size mounds were created. 3 of them were on the western side and other 2 were on the Eastern side of the courtyards.

4. How it works

The Victoria Crescent SuDS project works on multiple SuDS components to attenuate surface water from Council's social and affordable housing via various treatment trains. During which it has been allowed for some infiltration, evapotranspiration and eventually any overflow will be discharged back into gullies connected within Thames Water surface water sewer at less than greenfield runoff rates (< 5l/s).

A combination of source control features throughout the site and retrofit SuDS components were implemented. This is to satisfy the delivery of overall strategy along with taking the excess water from nearby impermeable areas and cleaning at the same time before discharging back into the gullies. To satisfy the drainage discharge hierarchy of Source Control, few rain gardens, swales, low turf channel and mounds were constructed. These were also topped up with erecting couple of new trees. The whole process will encourage bio-diversity and provide a level of final treatment along with infiltration and evapotranspiration before it goes back to the surface water sewers.

The overall scheme maximises the usage of SuDS blended into an excellent landscape design. The rain gardens, swales/low turf channel, mounds and tree planting slows the runoff, treats the water and also promote the interception losses. The design was catered for the 1 in 100 year rainfall event plus 40% Climate Change at a peak discharge rate at less than greenfield runoff rate. Flow controls have also been provided at the last circular rain garden connecting to both Eastern and Western side of the site.

Each rain garden consists of approximately 600mm deep excavation with natural surrounding and only one of them with the standard kerbs and gaps in between for the water runoff. All the rain gardens are filled with 450mm of sub soil and 150mm of topsoil with minimum of 75mm mulching. All the swales consist of approximately 600mm deep excavation with flat base, 600mm wide with an long fall between 1 in 200 and 1 in 50. The gradient on each side slopes are 1 in 3 with 100mm depth of water flow and 50mm freeboard. Each swale has a topsoil depth of 150mm.

The location of Victoria Crescent, South Tottenham gives an excellent opportunity for Council tenants and those passing by to take a view of overall scheme and the way the SuDS elements are operating which allows them to enjoy communal area too.

SuDS principles are used to manage surface water as it being captured, treated at source, controlled and conveyed on to the surface whilst providing an opportunity for water to be part of the courtyard's landscape scheme.

It is expected that water treatment processes will occur on the surface as well as within the actual growing plants . With the high proportion of SuDS for the impermeable contributing area the losses through evapotranspiration and infiltration mean the 5mm criteria for interception losses should easily be surpassed for this scheme. The Swales and low flow turf channel throughout the scheme remove pollutants from surface water, improve water quality as well as creating an

additional habitat for an aquatic species. All the Swales and Rain gardens are unlined intentionally to allow maximum infiltration.

As a part of the scheme, there was also one of the objective from “Homes for Haringey” to create and promote the play aspects out of SuDS scheme. We therefore, have provided timber bridge, balance beams, stepping logs, boulders and play logs to attract the children from nearby areas and those who are already living within those flats. It is also the intention that they spent quality time within the communal area and make friends by social gathering.

5. Specific project details

London Borough of Haringey commissioned detailed feasibility study to develop the environmental improvements for Victoria Crescent, at the same time enhancing its attraction as Communal area for council’s social and affordable housing. The feasibility study confirmed that practical SuDS features combined with modifications to surface water drainage network within the site would reduce the risk of flooding both locally and downstream of the site.

Considering the above, we employed SuDS designers Robert Bray Associates (RBA) to undertake the surface water drainage design with the modelling inputs from McCloy Consulting (MC). Throughout the project both these consultants provided full technical support and assisted in monitoring the compliance with overall drainage strategy. The landscape was designed to be resilient to climate change by optimising sustainable drainage to cool the urban environment with number of plants and newly erected trees. These planting and trees can also slow down and attenuate surface water runoff by connecting to the below ground “rooting zone” of soil cell crates.

There was also an early involvement of Council’s Highways and Drainage term contractors Ringway Jacobs / Hugh Pearl Land Drainage Ltd. We commissioned our Highways term contractors to carry out the works which were part of our wider flood & water management programme. Both RBA and MC worked quite closely with us and our term contractors for the successful delivery of the project.

In total 6 rain gardens, 5 mounds and two new trees were installed as a part of the SuDS scheme. Out of which 3 rain gardens and 3 mounds were installed on the Western side of the site. One massive “S” shaped rain garden and other rain garden was installed on the Easter Side of the site. The last rain garden was constructed in the middle of the site connecting both East and the West side of the site. The water from both the sides eventually end up in this rain garden after various treatment trains before any residual goes back into the gullies.

As a part of the above works, considering the location and the space available, two new trees were planted within the communal area as we all know that trees have a vital role to play in managing

the surface water for both infiltration and slowing down the flow. They also help in aid in water interception, storage and infiltration while increasing evapotranspiration potential.

The whole project was developed through regular contacts with all the stakeholders such as local Councillors, Residents, Utility Companies, EA, Thames Water etc. They were consulted by means of information letters circulated in October 2018 and February 2019, respectively. All the stakeholders had an opportunity to provide their comments on draft and final design proposal.

6. Maintenance & operation

The Victoria Crescent, will in time, reduce the cost of maintenance particularly those which are associated with regular surface water flooding and various blockages.

The maintenance of completed rain gardens, swales, mounds, and new trees are responsibility of Haringey's parks and open space team. "Homes for Haringey" are responsible for any play features and equipment within the parks and communal areas. Not only that but Haringey's F&WM team will also play key role in providing and taking some responsibility towards the management and maintenance of these features.

For the rain gardens, the low maintenance and high impacts planting were used. So that it requires minimal maintenance and topped up with mulching once a year. The grass cutting and pruning plants and weeds are carried out once or twice a year as a part of park's routine maintenance schedule. They have also took and agreed with additional responsibility for the plants in first couple of years, which includes replacement of plants, mulching and watering during the summer months.

Haringey's Park team also have their own management and maintenance plan and guidance document for each and every open space within the borough. This existing document for Victoria Crescent has been amended to include the maintenance and management plan as supplied by RBA, the landscape architect for this project.

7. Monitoring and evaluation

The overall scheme was designed and constructed whilst utilising SuDS features to reduce the flows from "Homes for Haringey's" drainage network to regenerate the communal area. It also improves the amenity value and quality of housing estate. The scheme is currently operational and well cared by "Homes for Haringey" officers and Haringey's Parks and open space management team. All the SuDS features are functioning successfully even after the recent storms Ciara and Dennis. The residents and children from those blocks of flats are also taking a walk, playing and enjoying their time in this recently developed communal area.

As a Borough, Haringey have taken the following few steps to monitor the scheme:

- Haringey's Flood and Water Management team and officers from "Homes for Haringey" are doing regular site visits during and after any rainfall event to monitor the management train and functioning of all SuDS features.

- Haringey have developed a website, where members or community can report an issue or problem for highways, drainage or parks etc.
- Our officers from "Homes for Haringey" are keeping close eyes on those features and the whole train how they work as a part of their weekly routine.

8. Benefits and achievements

Some of the key benefits of the project included :

- Reducing the surface water flooding withing council's social and affordable housing estate along with local roads and drainage network.
- Help to deliver the regeneration of courtyard that improves the quality of the local environment.
- Creating and improving valuable amenity, biodiversity and attractive landscaping.
- Use of relatively low-cost options with low maintenance requirements.

Some of the achievements of the project included :

- The project was appreciated by many local residents of Victoria Crescent, local Councillors, Friends of Chestnuts Park and officers from "Homes for Haringey".
- It was included within Haringey's internal staff magazine called "Environment and Neighbourhood news".
- The project was also mentioned in Greater London Authority's Sector Guidance for "Managing rain to transform Social Housing".

9. Lessons learnt

- During the project we received complaint from one of the resident about the large population of foxes that lives in dens in the courtyards. According to him they control local rats and mice and enquiring about wild life impact studies. For which we will have to do some research as it was not carried out and there were no foxes present on the site at the time.

  Following which we found out that, the study only require to be carried out on protected site such as National parks, areas of conservations, and special protection areas, wetlands not at the residential sites. Foxes are classed as wild animals, not pests so council has no statutory powers or legal rights to eradicate them.

- All the planting for rain gardens to be selected in such a way that more usage of native species and wild flower mix to encourage greater biodiversity. At the moment only 80% to 85% plants are native species.

- Each feature within the SuDS project and in the chain is as important as the next feature. However it is always important to start the work from the bottom or where the final discharge point is to ensure that sufficient falls have been allowed on all SuDS elements and the way they interact with each other.

10. Interaction with local authority

The London Borough of Haringey funded this project from their capital drainage budget for "Homes for Haringey", the council's social and affordable housing as we are committed to deliver a Sustainable Drainage Solution for the areas prone to flood risk. This was supported all the way by our stake holders. i.e. Residents of Victoria Crescent, Homes for Haringey, Consultants, Parks Team, Thames Water, Environment Agency etc.

The consultants and Haringey's F&WM team met several times during the project to ensure that all the stakeholders are satisfied with the scheme as a whole and the way it will function. There was also an early involvement and engagement of Haringey's Term contractor to make sure that the scheme is being delivered within the specified budget and timescale. A monthly meeting was organised initially with the consultant and then contractor for the duration of the work. A few site visits were also carried out by consultants, parks team and Haringey's F&WM team. The whole construction work was supervised by our clerk of works on almost daily basis.

11. Project details

Construction completed: *The whole project was completed on 17th May 2019.*

Cost: *The total cost of project was £130,280*

Extent: *The total site area was approximately 0.13Ha*

12. Project team

Funders	• London Borough of Haringey	Haringey LONDON

Clients	• Homes for Haringey	
Designers	• McCloy Consultants • Robert Bray Associates (RBA)	
Contractors	• Ringway Jacobs • Hugh Pearl Land Drainage Limited	
Other	• Residents of Victoria Crescent	

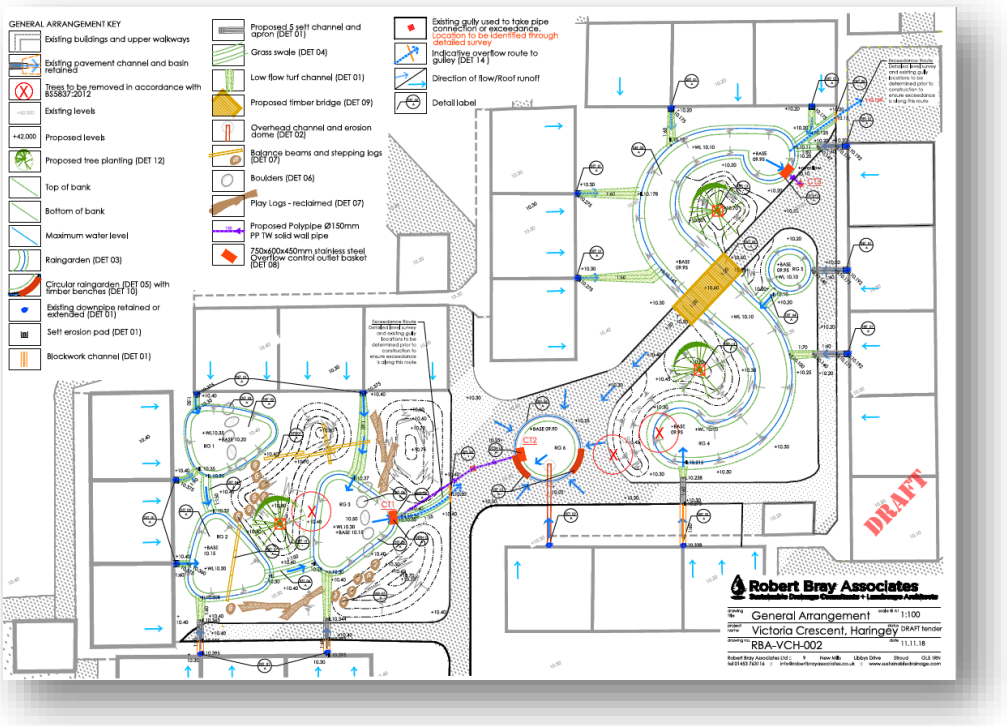

Fig. 1: Overall Scheme - General Arrangement

Fig. 2: Initial Site - Before the Works Commenced

Fig. 3: Western Side - Play Features integrated to attract children

Fig. 4: Eastern Side – Part of "S" shaped rain garden, mounds, and newly planted tree.

Fig. 5: During the construction of wooden Bridge and East side of scheme

Fig. 6: During the construction of Play logs and Boulders

Fig. 7: Rain Garden Connecting to East and West to give character to the scheme.

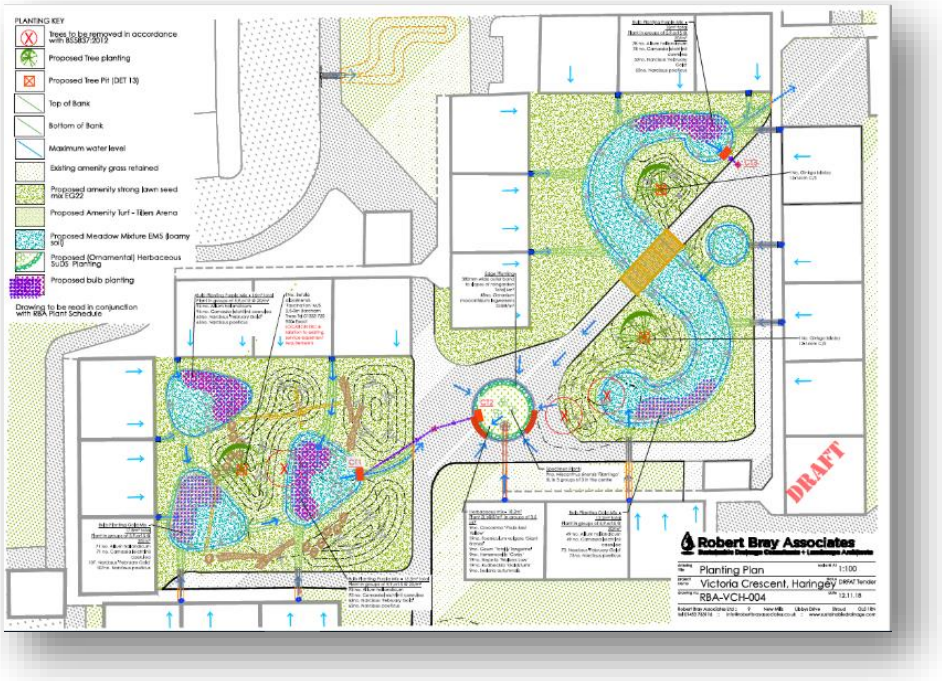

Fig. 8: Planting Details – Site in next 2 years with fully grown plants